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**Martin et al.**

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(54) **HUMIDITY CHAMBER FOR SCANNING  
STYLUS ATOMIC FORCE MICROSCOPE  
WITH CANTILEVER TRACKING**

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(58) **Field of Search** ..... 73/105, 865.6;  
250/306, 307

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(57) **ABSTRACT**

The present invention provides a novel humidity chamber suitable for use with an atomic force microscope (AFM). The humidity chamber of the present invention employs an intricate geometrical design which can accommodate a scanned-stylus AFM with an optical lever. This geometrical design allows the invention to enclose one or more of the AFM scanner, tip assembly, optical lever detection system, sample and an optical microscope objective lens, without degrading the ability to operate the AFM or the related systems. The invention is comprised of two major pieces: a chamber within which the AFM scanning head assembly is placed, and an integrated sample platform and spring-loaded base-plate that allows samples to be loaded and unloaded without removal of the chamber from the AFM scanning head assembly. The sample platform, which extends up from the base-plate and is inserted into the chamber, can include a magnet that is securely attached to the base. Once the sample platform is positioned inside the chamber, a locking pin can be inserted between the chamber and the bottom portion of the sample platform to secure the sample platform and base-plate. The spring-loaded base allows the z-directional motors of the AFM to be used to position the sample just below the probe prior to scanning, while at the same time providing an essentially air-tight fit between the chamber and the AFM scanning head. An embodiment of the present invention is suitable for use with components that sense and control the relative humidity inside the chamber.

**20 Claims, 5 Drawing Sheets**

